Redwood River project saves soil, strengthens flood control

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CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Funds supported construction of an earthen dam 3 miles upstream from Lake Redwood, part of a network of flood- and erosion-control measures. Ryan West Excavating of Tracy finished the work in October.
Photo Credit: Redwood SWCD

REDWOOD FALLS — Situated on either side of the Redwood River just 3 miles upstream from Lake Redwood, an earthen dam and a series of seven terraces will strengthen a network of flood- and erosion-control measures that combat altered hydrology within the Minnesota River basin.

A $140,210 water quality and storage pilot program grant the Minnesota Board of Water and Soil Resources (BWSR) awarded to Area II Minnesota River Basin Projects in 2023 supported the work. Environmental Quality Incentives Program (EQIP) assistance from the USDA's Natural Resources Conservation Service (NRCS) backed the terrace project. The city of Redwood's $32,850 contribution covered 15% of both projects, reducing landowners' cost to 10%.

By controlling water volume and velocity, the pilot program aims to protect infrastructure, improve water quality, and mitigate the effects of a changing climate.

Netzke

The second of two projects finished in December.

Together, the projects in Redwood Falls Township will keep an estimated 2,060 tons of sediment out of Lake Redwood every year — achieving 11% of the reduction goal for the subwatershed.

"In the big scheme of things, I think it's impressive," said Area II Executive Director Kerry Netzke. "This combination of a smaller dam plus these terraces for a $140,000 investment — or, if you include the local match, a $180,000 investment — to have that big of an impact, that 11%, that's big."

One of the grant-funded projects, a $64,000 grade stabilization, lies a quarter-mile south of the Redwood

Details

EARTHEN DAM: Area II covered 25% of engineering and flowage easement costs. In a 6.6-inch rain (100-year storm), designed to reduce peak flow by 8.5%, to 162 cubic feet per second. More effective in a 5.7-inch rain (50-year storm), reducing peak flow by nearly 60%, velocity to 58 cfs, and temporarily holding 9.6 acre-feet of water.

TERRACES: Finished in December by Ryan West Excavating, engineered by Southwest Prairie Technical Service Area staff, inspected by Redwood SWCD. Clean Water Funds and NRCS EQIP assistance covered 75% of the cost.

River. It consists of a 16-foot-tall, 270-foot-long earthen dam designed to temporarily hold water from heavy snowmelt or rains. Water released through a 24-inch concrete pipe flows to a rock-armored basin. The 130-acre drainage area will capture an estimated 125 tons of sediment and 125 pounds of phosphorus a year.

"The soil was getting washed into the river. Every time we'd have a significant rainfall event, it would carry more soil off of the farmland upstream from us and it would just continue to carry it into the river," said Tim Woelfel. He and five siblings own the 100-acre parcel, which is enrolled in the Conservation Reserve Enhancement Program (CREP).

Flooding had carved trenches and destroyed the access road.

"We were just losing soil, and the soil was going to Lake Redwood," Woelfel said.

The second grant-funded project, a $156,790 series of seven terraces designed to curb sheet-and-rill erosion, lies on the north side of the Redwood River. Water now moves through tiles ranging from 6 to 15 inches in diameter. The project will capture an estimated 1,935 tons of sediment a year. In the event of a 6.6-inch rain — a 100-year storm event — it's designed to reduce peak flow by nearly 80%, to 71 cubic feet per second.

To make the project fit the field, the renter and owner changed the direction they farmed the land.

"For us, it's already been successful because the downstream neighbors have seen what we can do and accomplish for water quality and storing water. They're jumping on board without me sitting at the coffee table with them to see if they want to do something. They're coming to me out in the field," said Brian Pfarr, Redwood Soil & Water Conservation District (SWCD) resource specialist.


Pfarr

Over the past few years, Pfarr had worked with landowners to install nine water and sediment control basins within a 5-mile radius of the dam and terrace projects. Early this year, he was working with landowners to install 29 more.

"My hope is always that the neighbors can see the quality work that we can provide and what we can provide for erosion control, and then they come in and ask for other projects," Pfarr said. That's how the Woelfel project transpired.

Pfarr has a list of about 80 Redwood County producers willing to pursue conservation projects. He meets landowners on their property to see their resource concerns firsthand and discuss potential solutions onsite. He surveys the sites, and then Area II engineers design projects — about a half-dozen a year — so they're prepared to apply when funds become available.

Eventually, Pfarr said he would like to see the entire 3-mile river corridor upstream from Lake Redwood protected from flood damage and erosion. Structures and practices such as permanent cover currently protect about 50% of that area.

"Our goal here is to capture the raindrop where it lands," Pfarr said. "If we can get that infiltrated, slowed down, it's just going to be a benefit to the river and the impact that it has downstream."

The Redwood River begins atop the Buffalo Ridge in northeastern Pipestone County. The elevation change makes it prone to flash-flooding, because the water picks up speed — and sediment — as it flows 127 miles north and east to the Minnesota River just north of Redwood Falls. Over the past 100 years, increased agricultural drainage has increased the volume of water that enters the river. Additionally, heavy rains have become increasingly frequent.

From the pilot grant-funded sites to the river's mouth, the riverbanks are tall, steep and prone to sloughing.

"The flood events that we had in 2018 and 2019 did a tremendous amount of damage to those streambanks," Netzke said. "It's very important to try to hold those floodwaters upstream, to reduce the amount of water coming down the river, and then to keep those banks stabilized. These two projects (worked) in conjunction with one another. One holds water back, the other one is holding sediment back. The combination of the two, at their location upstream of the lake, just made total sense."

Both projects will help to extend the life of the $8.5 million Lake Redwood hydraulic dredging project that removed 682,880 cubic yards of sediment, increasing the lake's depth from 2.5 feet to 20 feet.

"These projects are a direct point-source (of sediment-loading) to the lake, and we're fixing them. So the investment that taxpayers put into Lake Redwood getting it dredged, we can have an insurance policy that we're fixing the erosion upstream," said Pfarr, who brought the sites to the attention of Area II.

Area II typically focuses on larger projects, many of which have permanent ponds. Area II strongly encourages dry dams to maximize storage capacity.

"From a big-picture perspective of getting water retention on the ground, there's a lot of different ways to do it — everything from bigger reservoirs to road retentions, small dams," Netzke said. "I think a lot of people are seeing that there's cost-share made available for cover crops and for these other programs. But I don't think they fully realize what their purpose is or (what) the combination of small-scale to large-scale projects collectively (is) trying to do (on) the landscape, which is to store water, offset the timing of those flood flows so that we don't see those huge surges reaching our rivers at the same time."

Smaller-scale retention projects are more affordable for landowners, and financial incentives have made implementing soil health practices a more attractive option. Pfarr said farmers also save money by retaining topsoil and keeping fertilizer in the field and out of the river.

Another factor in play: Permits for permanent retention structures are becoming more difficult to obtain.

"It's kind of exciting to see these other new innovative ways for water storage," Netzke said. "Whether you're doing something small or doing something big, in the end, this is the result that we're trying to get."